A transnasal fiberoptic bronchoscopy was done to obtain tracheobronchial secretions for examination. This was carried out after the pneumomediastinum was recognized but before the pneumothorax developed. No brushings or biopsies were done. The procedure was tolerated with little coughing. We are unable to exclude the bronchoscopy as contributing toward development of the pneumothorax but the symptoms of sudden shortness of breath did not occur until several hours after the procedure.

The finding of mouth organisms in the culture of the TTA specimen probably indicates that the tip of the catheter was coughed into the pharyngeal area during the procedure. The authors do not want to defend the use of TTA or fiberoptic bronchoscopy in the management of this case. It should be noted, however, that at the time the procedures were done the diagnosis of fat embolism was not established.

Although TTA is recognized as a valuable diagnostic procedure in lower respiratory tract infections, it is not without complications. Where pneumomediastinum is present following transtracheal aspiration, clinical deterioration or sudden shortness of breath should alert clinicians to the possibility of pneumothorax.

Transtracheal aspiration should be included as another potential iatrogenic cause of pneumothorax.[7]

## Summary

In a patient with pulmonary insufficiency secondary to fat embolism, pneumomediastinum, pneumopericardium and bilateral pneumothorax developed following a transtracheal aspiration. Air dissection down the paratracheal fascial plane with rupture into the pleural spaces bilaterally is the proposed pathogenic mechanism for this unique complication.

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# Painless Subacute Thyroiditis Simulating Graves' Disease

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SUBACUTE THYROIDITIS (DeQuervain's thyroiditis) usually begins with painful, tender thyromegaly, evidence of hypermetabolism and nonspecific symptoms such as fever, malaise, myalgias and arthralgias.[1] Subacute thyroiditis without pain or tenderness is described in surgical reports[2-4] but not emphasized in medical series.[1,5-8] This report describes four cases, collected over two years, of painless subacute thyroiditis with initial symptoms and signs like those of hyperthyroidism. In all four patients (three female and 1 male), painless thyroid enlargement, clinical hyperthyroidism, elevated serum thyroxine levels, normal or only slightly elevated sedimentation rates and suppressed thyroidal uptake of radioactive iodine were present initially (Table 1). None of these patients had ingested exogenous thyroid hormone, iodides or other medications. During subsequent observation, the goiters and laboratory abnormalities disappeared and the patients became clinically euthyroid with only symptomatic support.

## Reports of Cases

CASE 1. A 19-year-old white male college student with no spontaneous complaints was seen for a preemployment physical examination. On examination, the thyroid gland was found to be enlarged to three times normal size and was firm but not tender. Findings from the physical examination were otherwise normal. Subsequent ques-

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tioning revealed a one month history of nervousness, heat intolerance, insomnia and a 5 kg weight loss, despite a good appetite.

A complete blood count was within normal limits with an erythrocyte sedimentation rate of 8 mm per hour (Westergren, normal for men is 0 to 10). Serum thyroxine by competitive protein binding was 14.3 μg per dl (normal 4 to 11 μg per dl). Resin T-3 uptake was 70 percent (normal 40 to 60 percent).

The patient was thought to have Graves' disease until the uptake of radioactive iodine ($^{131}I$) was found to be less than 2 percent at 24 hours (normal 10 to 30 percent). Treatment was deferred. Over the next four weeks the patient reported spontaneous clinical improvement but subsequently complained of fatigue, at which time a repeat test of serum thyroxine was found to be less than 1 μg per dl and administration of sodium levothyroxine (Synthroid®), 0.2 mg per day, was begun. Three months later, while still taking the medication, the T-4 and resin T-3 uptake were within normal limits. Thyromegaly had disappeared and the patient felt well. Administration of levothyroxine was discontinued. The patient was restudied two months later and was found to be euthyroid.

CASE 2. A 22-year-old white woman came to the emergency room because of palpitations and heat intolerance. During the preceding three weeks the patient had experienced nervousness, irritability, insomnia, heat intolerance and a 2.3 kg weight loss, despite good appetite. The patient said that there had been no neck pain.

The pulse was 110 beats per minute, blood pressure 140/70 mm of mercury. The skin was warm and moist to the touch. A fine tremor of the outstretched hands and lid lag were noted, but no other eye signs of Graves' disease. The thyroid gland was found to be enlarged to about 60 grams in size. It was firm in consistency and not tender. The remainder of the examination gave findings within normal limits.

The T-4 was 12.5 μg per dl with a resin T-3 uptake of 65 percent. Findings on complete blood count, Sequential Multiple Analysis (SMA) 12/60 and urinalysis were all within normal limits. Erythrocyte sedimentation rate was 22 mm per hour (Westergren, normal for women is 0 to 20). The uptake of radioactive iodine was less than 2 percent at 6 and 24 hours after administration. Titers of antimicrosomal and antithyroglobulin antibodies (Bio-Science) were within normal limits.

Over the next three weeks there was some regression of the thyromegaly. Serum thyroxine values fell to normal limits after three weeks and to less than 1 μg per dl after six weeks. At this time sodium levothyroxine (0.15 mg per day) was prescribed which resulted in the serum thyroxine value returning to within normal limits. Administration of the medication was discontinued after three months and the patient has remained euthyroid.

CASE 3. A 24-year-old white, married woman was evaluated for heat intolerance of six weeks duration, weight loss of 4.5 kg despite good appetite, and thyromegaly without associated pain.

The pulse was 120 beats per minute and blood pressure 130/60 mm of mercury. There were no eye signs of thyroid disease. The skin was warm and moist. There was a fine tremor present. The thyroid gland was enlarged to about twice the normal size and was firm but not tender.

The T-4 was 13.5 μg per dl; resin T-3 uptake, 63 percent. Uptake of radioactive iodine was 2 percent at both 6 and 24 hours. Complete blood count was within normal limits, with an erythrocyte sedimentation rate of 15 mm per hour (Westergren). Tests gave negative findings for antithyroglobulin and antimicrosomal antibodies.

The patient was given propranolol (Inderal®), 20 mg four times a day, but no other medications.

Over the next eight weeks the thyroid gland returned to normal size, administration of propranolol was discontinued and the patient be-

TABLE 1.—*Case Summaries—Painless Subacute Thyroiditis*

| *Case Number* | *Age (years)* | *Sex* | *Goiter* | *ESR** | *Initial 24hr $^{131}I$ Uptake† (percent)* | *Initial Serum T-4‡* | *Final Uptake (percent)* | *Final T-4* |
|---|---|---|---|---|---|---|---|---|
| 1 | 19 | M | 3× | 8 | 2 | 14.3 | .. | 8.0 |
| 2 | 22 | F | 3× | 22 | 2 | 12.5 | .. | 7.5 |
| 3 | 24 | F | 2× | 15 | 2 | 13.5 | .. | 8.4 |
| 4 | 13½ | F | 3× | 6 | 2 | 15.6 | 27 | 6.4 |

*Erythrocyte sedimentation rate: Normal male = 0-10 mm/hr; Normal female = 0-20 mm/hr.

†Normal = 10-30%.

‡Normal = 4-11 μg/dl.

TABLE 2.—*Association of Pain with Subacute Thyroiditis*

| *Previous Reports* | *Pain* | *No Pain* | *Total Patients* |
|---|---|---|---|
| *Medical* | | | |
| Schultz[5] | 24 | 0 | 24 |
| Volpe et al[6] | 52 | 4 | 56 |
| Vanderlinde et al[7] | 13 | 0 | 13 |
| Saito[8] | 49 | 2 | 51 |
| *Surgical* | | | |
| Woolner et al[2] | 21 | 16 | 37 |
| Stein et al[3] | 23 | 13 | 36 |
| Harland and Frantz[4] | <50% | .. | 27 |

came clinically euthyroid. Serum thyroxine was 8.4 μg per dl and resin T-3 uptake was 50 percent.

CASE 4. A 13½-year-old white girl came to the Ochsner Clinic because a surgeon advised thyroidectomy to treat an enlarged thyroid gland. She had had no irradiation to the head or neck as a child and had taken no thyroid hormone or iodides. She had noticed increased nervousness for two to three months, irritability and heat intolerance. There was no family history of thyroid disease.

The blood pressure was 120/70 mm of mercury; the heart rate varied between 100 and 84 beats per minute and there was a coarse tremor. There were no thyrotoxic eye signs. The thyroid gland was diffusely enlarged, three-fold on the left, and two-fold on the right, with no bruit. A grade I/VI pulmonic systolic ejection murmur was noted.

The serum thyroxine level was 15.6 μg per dl and the resin T-3 uptake was 59 percent. The thyroidal $^{131}I$ uptake was 2 percent at 24 hours, and the erythrocyte sedimentation rate was 6 mm per hour (Westergren). No therapy was instituted. Six weeks later the T-4 was 5.5 μg per dl, the $^{131}I$ uptake 27 percent at 24 hours and the erythrocyte sedimentation rate, 3 mm per hour. The heart rate was 72 beats per minute. The thyroid was enlarged two-fold diffusely with the right lobe now slightly larger than the left. Three months after the initial examination the thyroid gland was not palpable and the T-4 was 6.4 μg per dl. In this interval her weight had risen from 45 to 50 kg. She remained asymptomatic.

## Discussion

The differential diagnosis in a patient with elevated serum thyroxine levels (corrected for protein binding abnormalities) would include: (1) autonomous diffuse or nodular toxic goiter; (2) thyrotoxicosis factitia;[9,10] (3) hyperthyrotropic hyperthyroidism[11] from hypothalamic, pituitary or ectopic sources such as choriocarcinoma, hydatidiform mole or testicular carcinoma; (4) struma ovarii;[12] (5) jodbasedow, that is, iodide-induced hyperthyroidism;[13] (6) functioning metastases from thyroid carcinoma,[14] and (7) subacute thyroiditis.[1]

In patients reported here there was no history of iodide ingestion or thyroid hormone exposure before the initial evaluations. The combination of thyromegaly and a very low thyroidal uptake of $^{131}I$ without known iodide exposure eliminated toxic goiter, hyperthyrotropic hyperthyroidism, and jodbasedow. It made the diagnosis of factitious hyperthyroidism unlikely. Subacute thyroiditis seemed the likely diagnosis and the subsequent spontaneous resolution resembled the course of more typical cases.

Whereas in most patients with subacute thyroiditis there are greatly elevated erythrocyte sedimentation rates which serve to suggest the diagnosis of symptomatic subacute thyroiditis, in these four patients that were either normal or only slightly elevated erythrocyte sedimentation rates.[1] In two of the four patients transient hypothyroidism developed. In both, euthyroidism without replacement therapy eventuated, and in all four patients thyromegaly resolved completely.

The incidence of asymptomatic subacute thyroiditis in surgical series is high compared with its incidence in medical reports (Table 2). Volpe and co-workers[6] reported that only four of their 56 patients with subacute thyroiditis had thyromegaly without pain or tenderness. The diagnosis in two was made only after examination of surgically removed tissue. The clinical presentation of the other two was not specified. Three cases somewhat similar to the ones reported here were described recently by Papapetrou and Jackson.[15] Thyrotoxicosis was present also in their patients; however, thyromegaly was absent in two of the three and erythrocyte sedimentation rates were not reported. Hamburger[16] reported that 13 of 29 patients with subacute thyroiditis had minimal pain or tenderness and provided descriptions of two. One had been exposed to exogenous iodides and the other had no thyromegaly. Erythrocyte sedimentation rates were not reported.

These cases show that subacute thyroiditis can occur in the absence of thyroid pain or tender-

ness and with normal or only slightly elevated erythrocyte sedimentation rates. The importance of measuring the uptake of radioactive iodine in patients with thyrotoxicosis is reemphasized here since the initial diagnosis of Graves' disease was questioned only after discovery of depressed uptake of radioactive iodine. Specific determinations of serum thyroid hormone levels do not allow distinction among the various causes of hyperthyroidism and therefore have not obviated the value of the radioactive iodine uptake test in assessing thyroid gland function.

All the present methods of treating thyroid gland hyperfunction involve some risk of morbidity to the patient. Therefore, specific antithyroid treatment should be deferred until the source of the hyperthyroidism has been determined. In all four of the patients reported here the goiter resolved completely and the patients became euthyroid with only symptomatic support.

## Summary

Clinical hyperthyroidism, goiter, elevated T-4 and resin T-3 uptake values and depressed thyroidal uptake of radioactive iodine were present in four patients. This combination in the absence of a history of ingestion of iodide or thyroxine-containing preparations suggested the possibility of subacute thyroiditis, although the usually associated anterior neck pain was absent. Despite only symptomatic treatment the hyperthyroidism and goiter disappeared thus mimicking the clinical course of subacute thyroiditis.

These case histories emphasize the importance of the radioactive iodine uptake test in distinguishing among the possible causes of hyperthyroidism. Had this test not been carried out, a diagnosis of Graves' disease might have been made.

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